

# PATENT ABSTRACTS OF JAPAN

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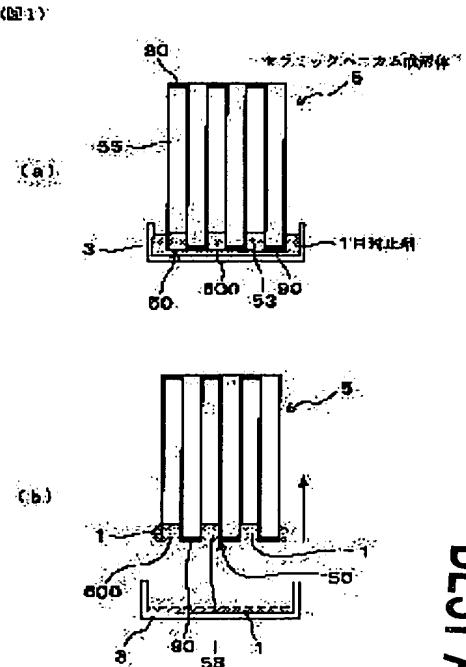
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## (54) METHOD OF SEALING HONEYCOMB CERAMIC FORMED BODY

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a method of sealing openings, by which the deformation/ dissolution of a dipped part of a ceramic honeycomb formed body can be suppressed when it is dipped in a sealing agent, and to provide the sealing agent.

**SOLUTION:** In the method of sealing the openings at the prescribed end face not to be sealed in the whole end face, which comprises coating the end face not to be sealed in the whole end face 50 of the ceramic honeycomb formed body 5 with a masking material, and then dipping the end face 50 into the sealing agent 1 while keeping the coated state, the sealing agent 1 is composed of ceramic particles and an auxiliary agent for fluidizing the ceramic particles, and the auxiliary agent is unable to redissolve a binder contained in the ceramic honeycomb formed body.



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**CLAIMS****[Claim(s)]**

[Claim 1] In the condition of having covered with masking material, the end face which does not carry out eye closure among the end faces of a ceramic honeycomb Plastic solid In the approach which is immersed into eye encapsulant in the end face of the above-mentioned ceramic honeycomb Plastic solid, and carries out eye closure of the predetermined end face among the end faces of the above-mentioned ceramic honeycomb Plastic solid the above-mentioned eye encapsulant It is the eye closure approach of the ceramic honeycomb Plastic solid which consists of a ceramic particle and an assistant for making this fluidize, and is characterized by this assistant having the property in which the binder in the above-mentioned ceramic honeycomb Plastic solid is not made to remelt.

[Claim 2] It is the eye closure approach of the ceramic honeycomb Plastic solid characterized by consisting of one sort as which the above-mentioned assistant is chosen from the group of a petroleum system hydrocarbon, straight mineral oil, animal and vegetable oils, higher alcohol, and synthetic oil in claim 1, or two sorts or more.

[Claim 3] The eye closure approach of a ceramic honeycomb Plastic solid that the input of the above-mentioned eye encapsulant is characterized by considering as a complement at one immersion while putting the above-mentioned eye encapsulant into the container of the magnitude which can hold the end face of the above-mentioned ceramic honeycomb Plastic solid in claim 1.

[Claim 4] It is the eye encapsulant which the above-mentioned eye encapsulant consists of a ceramic particle and an assistant for making this fluidize in the eye encapsulant for carrying out eye closure of the end face of a ceramic honeycomb Plastic solid, and is characterized by this assistant having the property in which the binder in the above-mentioned ceramic honeycomb Plastic solid is not made to remelt.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]**

[0001]

[Field of the Invention] This invention relates to the eye closure approach and eye encapsulant of a ceramic honeycomb Plastic solid for carrying out uptake of the diesel particulate.

[0002]

[Description of the Prior Art] For example, as the filter structure which carries out uptake of the particulate in the exhaust gas of an automobile, as shown in drawing 5 (a) and (b), many cels 88 are formed by the septum 81, it becomes, and there is a ceramic honeycomb structure object 8 which formed the lock out section 83 which blockaded the cel edge of some [ further ] cels 88 by the lock out material 830 by turns. In manufacturing this ceramic honeycomb structure object 8, first, the methyl cellulose as a binder, water, and the stearin acid emulsion as lubricant are prepared and scoured to silicon carbide powder, a condition is acquired, and the ceramic honeycomb Plastic solid of the penetration condition to which opening of the cel edge of the both ends of a cel 88 was carried out is produced using this as indicated by JP,9-25180,A, for example. Then, in a both-ends side, the lock out material 830 is packed and one side of the cel edge which carried out opening is blockaded.

[0003] In blockading the cel edge of ceramic honeycomb Plastic solid 86, as shown in drawing 6 (a) and (b), a wax 90 is stuffed into the cel edge of each cel 88 by putting the wax sheet 91 as masking material on the end face of ceramic honeycomb Plastic solid 86, and pressing this. Subsequently, as shown in drawing 6 (c), handicraft or laser removes the wax 90 put in the cel edge which should be blockaded, and the embarrassed cel edge 880 is formed.

[0004] Subsequently, turn caudad the end face which packed the wax 90, the slurry-like eye encapsulant 60 is made immersed, and this eye encapsulant 60 is made to infiltrate into the cel edge 880 which removed the wax 90. as eye encapsulant -- silicon carbide powder -- receiving -- the methyl cellulose as a binder, water, and the trimethylamine as a dispersant -- in addition, what was made into the slurry is used. Then, the eye encapsulant 60 is dried, it calcinates and a wax 90 is removed. Thereby, eye closure of the cel edge of a ceramic honeycomb Plastic solid can be carried out by turns.

[0005]

[Problem(s) to be Solved] However, in the eye closure approach of the above-mentioned conventional ceramic honeycomb Plastic solid, when the edge of a ceramic honeycomb Plastic solid was immersed into eye encapsulant, the edge deformed and, sometimes, there was a case where it dissolved.

[0006] When the artificer studied wholeheartedly the cause of the deformation and the dissolution of the immersion part of a ceramic honeycomb Plastic solid, he found the following things. That is, since the methyl cellulose contained in the ceramic honeycomb Plastic solid is water solubility, it will swell and soften and a ceramic honeycomb Plastic solid will deform, if the water in eye encapsulant is adsorbed. and -- if moisture is adsorbed further -- the methyl cellulose as a binder -- remelting -- the condition that silicon carbide powder is scattering -- becoming -- a honeycomb configuration -- a \*\* form -- it cannot do -- becoming -- just -- being alike -- it will melt.

[0007] In view of this conventional trouble, this invention tends to offer the eye closure approach and eye encapsulant of a ceramic honeycomb Plastic solid which can control deformation and the dissolution of the immersion part in a ceramic honeycomb Plastic solid, when immersed into eye encapsulant.

[0008]

[Means for Solving the Problem] Invention of claim 1 is in the condition which covered with masking material the end face which does not carry out eye closure among the end faces of a ceramic honeycomb Plastic solid. In the approach which is immersed into eye encapsulant in the end face of the above-mentioned ceramic honeycomb Plastic solid, and carries out eye closure of the predetermined end face among the end faces of the above-mentioned ceramic honeycomb Plastic solid the above-mentioned eye encapsulant Consisting of a ceramic particle and an assistant for making this fluidize, this assistant is the eye closure approach of the ceramic honeycomb Plastic solid characterized by having the property in which the binder in the above-mentioned ceramic honeycomb Plastic solid is not made to remelt.

[0009] It is the point which should be most observed in this invention of using the assistant with the property which does not melt the binder contained in the ceramic honeycomb Plastic solid instead of the water conventionally contained in eye encapsulant.

[0010] In this invention, an assistant is used in order to give a fluidity to a ceramic particle and a binder. Unlike water, this assistant has the property in which the binder in a ceramic honeycomb Plastic solid is not dissolved. For this reason, when a ceramic honeycomb Plastic solid is immersed into eye encapsulant, that immersion part does not dissolve in eye encapsulant. Therefore, deformation and the dissolution of the eye encapsulant immersion part of a ceramic honeycomb Plastic solid can be controlled.

[0011] As for the above-mentioned assistant, like invention of claim 2, it is desirable to consist of one sort chosen from the group of a petroleum system hydrocarbon, straight mineral oil, animal and vegetable oils, higher alcohol, and synthetic oil or two sorts or more. Thereby, deformation and the dissolution of the immersion part of a ceramic honeycomb Plastic solid can be controlled effectively. Highly [ resin solubility ], as for these assistants, what has low compatibility with water is good, for example, they have AF solvent (trade name) etc.

[0012] The content of the assistant in eye encapsulant is suitably chosen so that a fluidity may have eye encapsulant, and a wall surface may be adsorbed in an assistant during ceramic honeycomb Plastic solid immersion, concentration of eye encapsulant may arise and the temporary solidification of the eye encapsulant can be carried out in a cel. The concrete amount is chosen according to the class and property of an assistant. For example, when AF solvent (trade name) is used as an assistant, as for the content of the assistant in eye encapsulant, it is desirable that it is 50 - 70 % of the weight. The fluidity of eye encapsulant is low, and there is a possibility that it may become difficult to carry out eye closure of the cel end face, and in exceeding 70 % of the weight, there is a possibility that the thickness of the eye closure may become an ununiformity in less than 50% of the weight of a case.

[0013] As for the ceramic particle contained in eye encapsulant, it is desirable to use a ceramic honeycomb Plastic solid, a thing of the same kind, or the approximated thing. It is for making burning shrinkage and a coefficient of thermal expansion approximate, and preventing crack initiation. As a ceramic particle, there are cordierite generation material, mullite generation material, an alumina, silicon carbide, silicon nitride, etc., for example.

[0014] The binder may be contained in eye encapsulant. A binder achieves the duty which pastes up ceramic particles. As this binder, celluloses, such as methyl cellulose and ethyl cellulose, an acrylic binder, polyvinyl alcohol, etc. can be used. Depending on the combination of the ceramic particle kind of material in eye encapsulant, and an assistant, a binder is ommissible. For example, a ceramic particle is cordierite generation material, and it is also possible to omit a binder when an assistant is AF solvent.

[0015] If a lot of eye encapsulants are put in in a container and the end face of a ceramic honeycomb Plastic solid is immersed into it, the eye closure by eye encapsulant will become difficult. In order that a ceramic honeycomb Plastic solid not only absorbs the assistant of an eye closure part, but may absorb an assistant from a lot of eye encapsulants in a container, before carrying out temporary solidification of the reason, it is because the eye encapsulant of an end face is omitted when assistant absorption of a ceramic honeycomb Plastic solid reaches a saturation state, and it becomes inadequate temporary solidifying it at the edge of a ceramic honeycomb Plastic solid and it takes out from eye encapsulant.

[0016] Then, while putting the above-mentioned eye encapsulant into the container of the magnitude which can hold the end face of the above-mentioned ceramic honeycomb Plastic solid like invention of claim 3, it is desirable that the input of the above-mentioned eye encapsulant considers as a complement at one immersion. In the container, eye encapsulant required for the eye closure of one batch is put in. If a ceramic honeycomb

Plastic solid is laid in this container, eye encapsulant infiltrates into that through tube wall. And the assistant in eye encapsulant is absorbed by the ceramic honeycomb Plastic solid, and the viscosity becomes high gradually. Soon, temporary solidification of the eye encapsulant which advanced into the edge of a ceramic honeycomb Plastic solid is carried out, and it serves as sufficient hardness even for extent which is not dedropping.

Therefore, according to this approach, eye closure of the end face of a ceramic honeycomb Plastic solid can be carried out certainly. After a complement removes for example, a \*\* agent, one immersion has them than the whole eye closure section product in one cel end face, and they say the amount which becomes less than the whole product which united the eye closure section of two cel end faces to it. [ more ]

[0017] The flat-surface area of the container into which eye encapsulant is put is the range which does not have trouble in the activity which takes a ceramic honeycomb Plastic solid in and out, and it is desirable to make it small. It is for being able to lessen the amount of the assistant used for one batch, and ensuring temporary solidification.

[0018] After adding lubricant if needed, mixing with a binder and water to a ceramic particle, scouring to it and considering as a condition, a ceramic honeycomb Plastic solid is fabricated in the configuration of a honeycomb structure object using a mold, and is acquired by carrying out desiccation solidification. After a ceramic honeycomb Plastic solid performs the eye closure approach of this invention, it is calcinated and turns into a ceramic honeycomb structure object.

[0019] In eye encapsulant for invention of claim 4 to carry out eye closure of the end face of a ceramic honeycomb Plastic solid, the above-mentioned eye encapsulant consists of a ceramic particle and an assistant for making this fluidize, and this assistant is eye encapsulant characterized by having the property in which the binder in the above-mentioned ceramic honeycomb Plastic solid is not made to remelt.

[0020] The assistant which has the property in which the binder in a ceramic honeycomb Plastic solid is not made to remelt, instead of water is included in the eye encapsulant of this invention for fluidization. For this reason, it can control that the immersion part of a ceramic honeycomb Plastic solid deforms and dissolves during ceramic honeycomb Plastic solid immersion.

[0021]

[Embodiment of the Invention] The eye closure approach of the ceramic honeycomb Plastic solid concerning the operation gestalt of example of operation gestalt 1 this invention is explained using drawing 1 - drawing 3. This example is an approach which is immersed into the slurry-like eye encapsulant 1 and carries out eye closure of the end face of ceramic honeycomb Plastic solid 5, as shown in drawing 1.

[0022] Ceramic honeycomb Plastic solid 5 by which the eye closure is carried out mixes 5 % of the weight of methyl cellulose as a binder, and 19 % of the weight of water and 3 % of the weight of synthetic oil as lubricant with the ceramic particle 73 weight section, fabricates it a slurry, nothing, and in the shape of a honeycomb, and is dried. The cel 55 of ceramic honeycomb Plastic solid 5 is a square cylinder whose one side is 1.2mm, and wall thickness is 0.3mm. The magnitude of whole ceramic honeycomb Plastic solid 5 is a cylinder object with a diameter [ of 140mm ], and a die length of 130mm. As a ceramic particle, the mixture of talc, a kaolin, and hydroxylation aluminum powder is used for cordierite generation material and a concrete target.

[0023] First, as shown in above-mentioned drawing 6 (a) - (c), the cel end face 50 of the above-mentioned ceramic honeycomb Plastic solid is covered with a wax 90 by turns. A wax 90 is masking material. The wax 90 makes the part which sticks a wax sheet on the cel end-face 50 whole of a ceramic honeycomb Plastic solid, irradiates laser after that only at the part which carries out eye closure, opens the opening hole 500, and does not carry out eye closure cover as it is.

[0024] Next, as shown in drawing 1 (a), the eye encapsulant 1 is prepared. Eye encapsulant mixes and prepares 40 % of the weight of ceramic particles, and 60 % of the weight of assistants for making this fluidize. The same thing as the ceramic particle of the above-mentioned ceramic honeycomb Plastic solid is used for a ceramic particle. AF solvent (trade name) is used as an assistant.

[0025] Next, as shown in drawing 1 (a), the eye encapsulant 1 is put in into the container 3 of a plate configuration. Magnitude of a container 3 is made into extent containing the end face 50 of ceramic honeycomb Plastic solid 5, and its width of face A of one side is large about 3mm to the diameter of the end face 50 of ceramic honeycomb Plastic solid 5. The input to the container 3 of the eye encapsulant 1 is taken as one eye closure actuation. The liquid thickness of the eye sealing agent 1 before ceramic honeycomb Plastic solid 5 immersion is 3mm.

[0026] Next, in the eye encapsulant 1 in a container 3, it is immersed slowly, and ceramic honeycomb Plastic solid 5 is directly laid in the container base 30, and is left in this condition. As shown in drawing 2, between neglect, the assistant 2 in the eye encapsulant 1 is absorbed in the cell wall 51 of ceramic honeycomb Plastic solid 5, viscosity becomes large, temporary solidification is carried out soon, and the lock out section 53 is formed. Neglect time amount is carried out until this temporary solidification occurs, and it is 2 - 5 minutes about.

[0027] In addition, if the input of the eye encapsulant 1 is made [ many ] and liquid thickness before immersion is enlarged as shown in drawing 3, the eye encapsulant 1 will be filled up one after another from the cel end face 50, and high concentration-ization of the lock out section 53 will stop being able to progress easily. After temporary solidification is completed, as shown in drawing 1 (b), the excessive eye encapsulant 1 which adhered ceramic honeycomb Plastic solid 5 to drawing and its wall surface from the eye encapsulant 1 is removed.

[0028] By the above, the eye closure of a ceramic honeycomb Plastic solid is completed. The same actuation as this is performed also about the cel end face of the opposite side. When the cel end face of a ceramic honeycomb Plastic solid was observed after the eye closure, neither deformation nor the dissolution was produced at the cel edge. The eye closure was carried out to uniform thickness.

[0029] Then, it calcinates at 1400 degrees C. Thereby, the wax 90 as masking material is burned down, and the ceramic honeycomb structure object of a cordierite system with which the eye closure of the cel end face 50 was carried out by turns is acquired. It is equipped with the acquired ceramic honeycomb structure object in the middle of the exhaust pipe of the DIZERU engine of an automobile as a diesel particulate filter.

[0030] The content of the assistant in eye encapsulant was examined in the example of two examples of an operation gestalt. The ceramic particle and binder in eye encapsulant were made into the same ratio as this using the same thing as the example 1 of an operation gestalt. The assistant in eye encapsulant was changed among 50 - 70 % of the weight. AF solvent was used as an assistant. The eye closure was made the ceramic honeycomb Plastic solid by the same approach as the example 1 of an operation gestalt using this eye encapsulant. Eye closure of the four ceramic honeycomb Plastic solids was carried out about each concentration of an assistant. The eye closure thickness at this time was measured, and it was shown in drawing 4.

[0031] In this drawing, the content (% of the weight) of the assistant in eye encapsulant was taken along the axis of abscissa, and eye closure thickness (mm) is taken along the axis of ordinate. R shows the variation in eye closure thickness, and X shows the average. This result shows that eye closure thickness is thin, so that the content of an assistant increases.

[0032] The absorbed amount to ceramic honeycomb Plastic solid 5 of an assistant is restricted, and this can carry out the eye closure of the almost same thickness as the thickness which adhered in early stages of neglect, when there are few assistants. However, it is because the absorbed amount to the ceramic honeycomb Plastic solid of an assistant increases, so the amount of the eye encapsulant which remains in a cel edge will decrease when temporary solidification is carried out if the assistant in eye encapsulant increases. Moreover, if an assistant is increased, the viscosity of eye encapsulant becomes small, when a ceramic honeycomb Plastic solid is laid, eye encapsulant will escape to the outside quickly, and it will also be considered as a cause that the amount which enters in a cel right above decreases. Moreover, when the concentration of an assistant is 50 - 55 % of the weight, there is little variation in eye closure thickness, but when it exceeds 55 % of the weight, it also turns out that the variation in eye closure thickness (R) becomes large.

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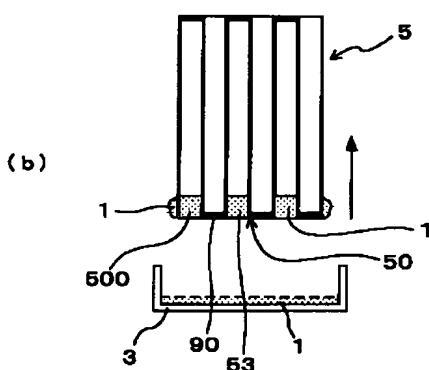
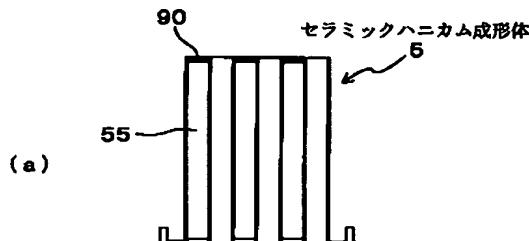
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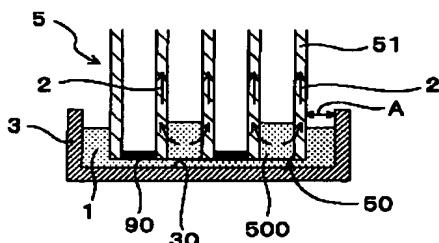
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## DRAWINGS

[Drawing 1]  
(図1)

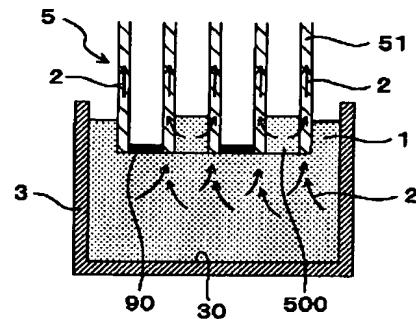


[Drawing 2]  
(図2)

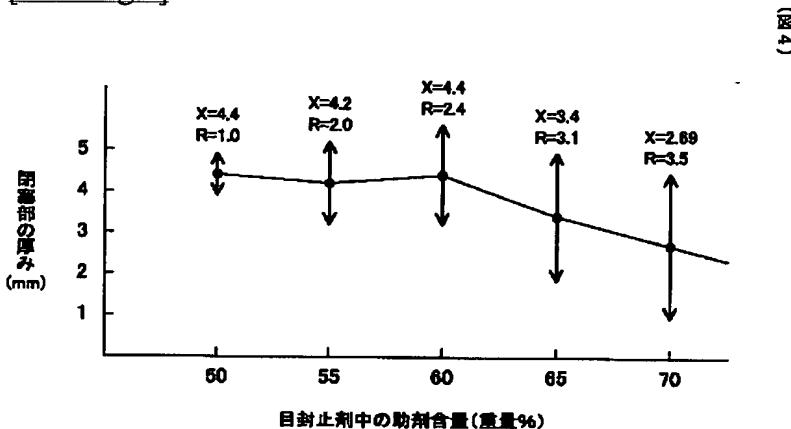


[Drawing 3]

(図3)

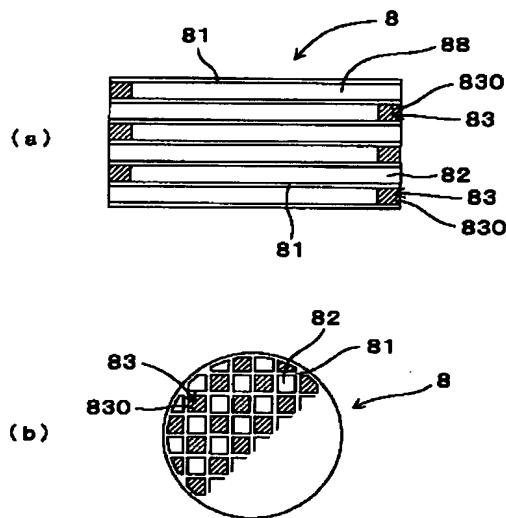


[Drawing 4]

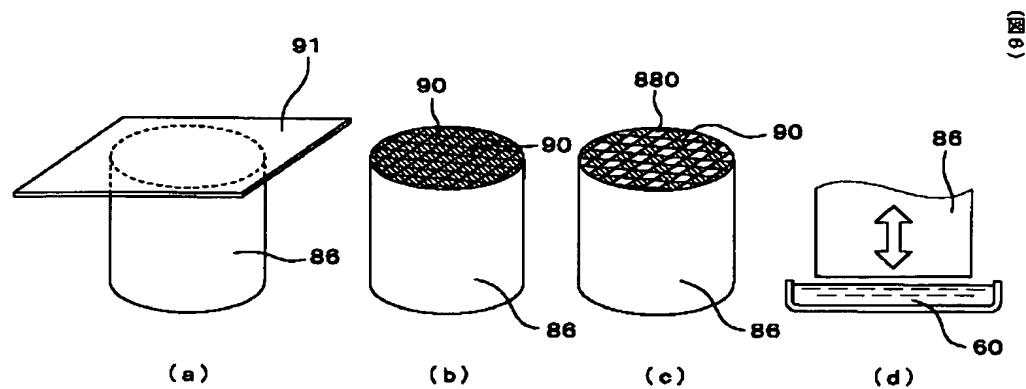


[Drawing 5]

(図5)



[Drawing 6]



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